(12) UK Patent Application (19) GB (11) 2 281 458 (13) A

(43) Date of A Publication 01.03.1995

(21) Application No 9317893.7

(22) Date of Filing 27.08.1993

(51) INT CL[6]
H04Q 7/30 , H02J 1/00 // H02J 9/06 , H04B 1/74

(52) UK CL (Edition N)
H2H HAJ HAK HSL
U1S S2204 S2213

(56) Documents Cited
GB 1513812 A EP 0310284 A2 EP 0287305 A2
US 4935642 A US 4902956 A US 4129893 A

(58) Field of Search
UK CL (Edition L) H2H HAA HAD HAJ HAK HSL , H2K KCX , H4L LDFC LECX
INT CL[5] H02H 3/24 7/12 , H02J 1/00 3/14 , H02M 3/28 7/08 7/17 7/23 , H04B 1/16 1/74 , H04M 1/72 , H04Q 7/00 7/02 7/04
ONLINE DATABASES: WPI

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(54) Apparatus for managing power supply to a telecommunications base station

(57) A base station of a cordless telephone system has three pairs of transceivers 26. Power to the transceivers 26 is provided by a parallel array of power supply units 12 which deliver power to the transceivers 26 through a power distribution unit 18. Individual power buses 20, 22, 24 supply power from the power distribution unit 18 to the transceivers 26 and to a station unit 28. If the output voltage from the power supply units 12 falls, the power distribution unit 18 progressively isolates the power buses in accordance with a predetermined power-shedding priority rating, to provide a progressive and organised reduction in capability under fault conditions. In an alternative arrangement having a single power bus (30), (Figure 2), internal power supply relays in each transceiver are controlled in accordance with the power-shedding priority rating. If the system is operating on battery power 16, following failure of the primary power source 10, low priority equipment is disconnected to conserve power.

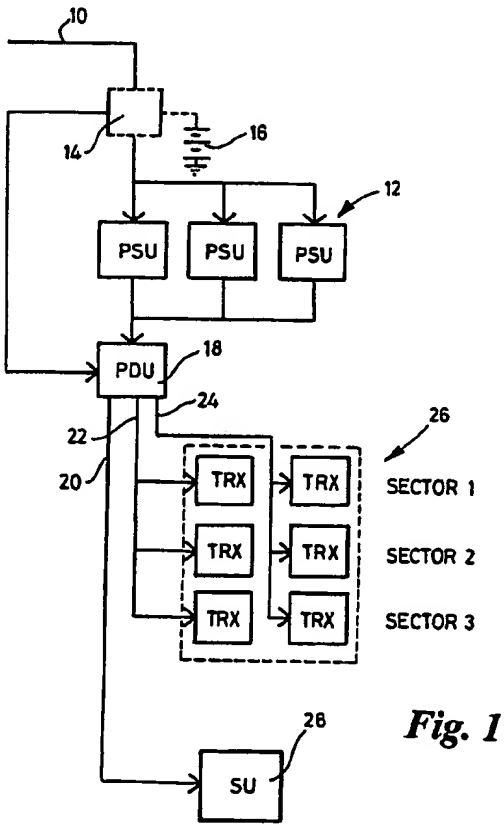

Fig. 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

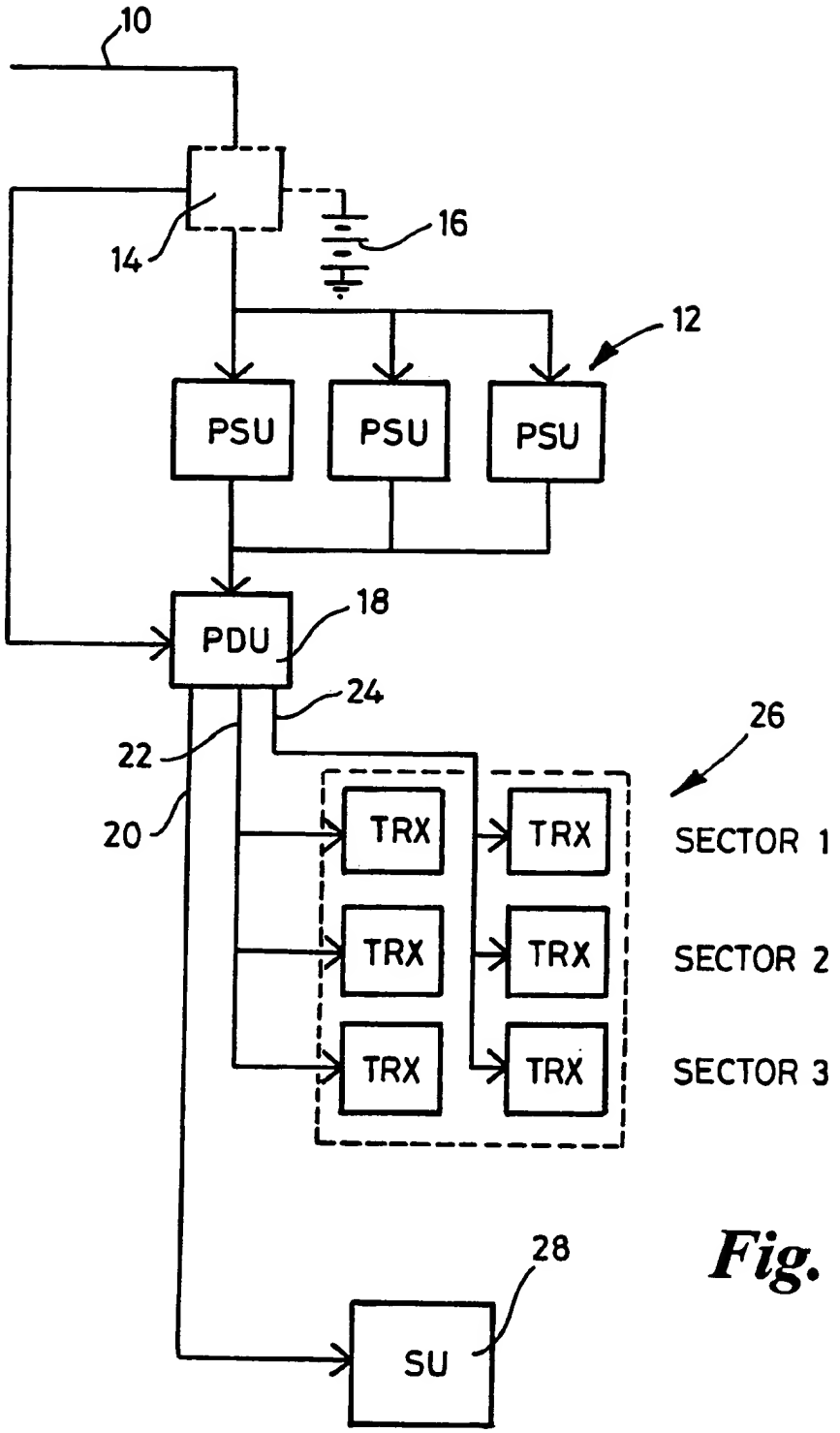
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Fig. 1

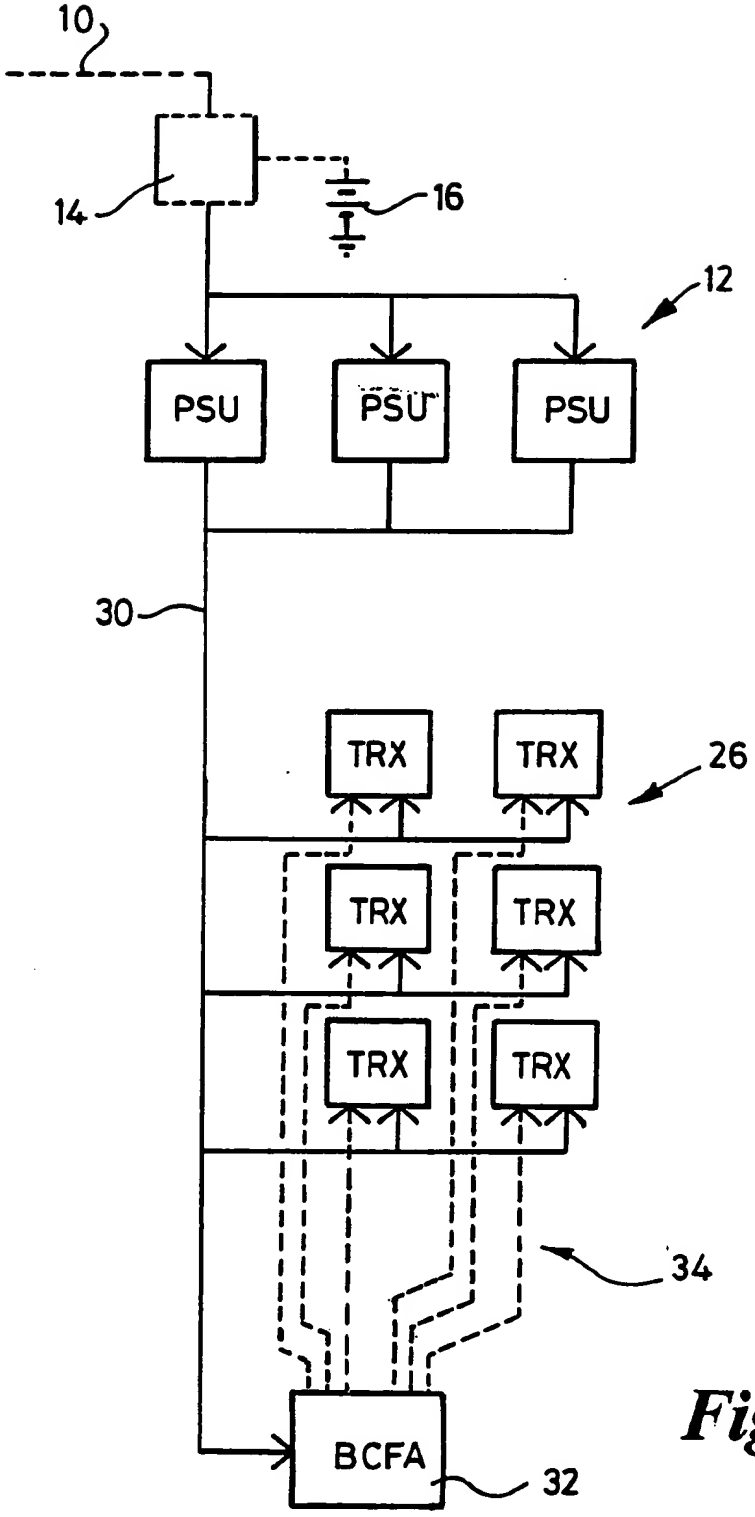

Fig. 2

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Title: Power Supply Management

This invention relates to apparatus for managing power supply to a base station, preferably a base transceiver station (BTS) in a cordless telephone system such as GSM (Groupe Systeme Mobile).

A BTS often contains multiple power supply units (PSU) and multiple transceivers (TRX). To achieve a high degree of reliability, it is usual to include redundant PSUs and TRXs. It has proved difficult in general to provide a design solution which can achieve optimum reliability and flexibility, for a given amount of hardware.

According to the invention apparatus for managing power supply to a base station having a plurality of transceivers comprises a plurality of power supply units connected in parallel, control means connected to the output of the power supply units and operative, upon a reduction in voltage from the power supply units, to disconnect the transceivers in a progressive manner in accordance with a predetermined power-shedding priority rating.

Preferably, the control means comprise a power distribution unit which supplies the transceivers on power buses to which the priority ratings are accorded. Alternatively, the control means may comprise switches (such as relays) which control the supply of power to the

transceivers and which are operative to disconnect the transceivers in accordance with the predetermined power shedding priority rating.

Hence, the control means are pre-programmed with the priority ratings of the transceivers. When the voltage supplied by the parallel connected power supply units falls below a predetermined threshold, the transceiver or transceivers having the lowest priority rating is or are disconnected. If the input voltage falls further, the transceiver or transceivers having the next lowest priority rating is or are disconnected, and so on. Reconnection can be achieved when the input voltage is restored, the control means having the logic to implement this load shedding and load restoration procedure in accordance with the pre-programmed priority rating, which can be altered from time to time to suit differing priority ratings of the transceivers.

Two embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a block circuit diagram of the first embodiment, and

Figure 2 is a block circuit diagram of the second embodiment.

Referring to Figure 1, an external supply 10 feeds three parallel-connected power supply units (PSU) 12 though a battery charger regulator 14 to which is connected a stand-by battery 16. The PSUs are fused, diode-protected and output limited so that a failure of one of the PSUs

cannot disrupt or damage the others. The output voltage of the power supply units 12 is fed to a power distribution unit (PDU) 18 powered from the regulator 14. Two output buses 22, 24 from the PDU 18 supply the three pairs of transceivers 26 in a trisector base station of a GSM cellular radio system. A third output bus 20 supplies a station unit 28 which provides control and transmission facilities for the base station. The three output buses 24, 22, 20 are respectively accorded low, medium and high priority ratings in the PDU. The PDU monitors the input voltage from the three parallel connected power supply units 12. If the input voltage falls below a predetermined threshold, the PDU 18 isolates the power bus 24 having the lowest priority rating. This isolates one transceiver of the pair of transceivers serving each sector. If the input voltage drops further the output bus 22 is isolated, and a further drop in input voltage to the PDU causes the bus 22 to be disconnected. Upon power up or system reset, the PDU energises the output buses sequentially. If there is a primary failure, and the BTS is running on standby batteries, the PDU will disconnect low priority equipment to conserve battery power.

The PDU 18 contains an analogue voltage sensing circuit, an 8051 microprocessor and a set of multi-pole relays which control power supply to the buses. Its simple construction and function guarantee a high reliability. The power buses contain several supply voltages, such as +12, +5 and -12 volts.

Referring to Figure 2, the apparatus again comprises an external supply 10 feeding three parallel-connected power supply units through the intermediary of a battery charge regulator 14 linked to a stand-by battery 16.

The output voltage from the three PSUs 12 forms a common power bus 30 which goes to each of the three pairs of transceivers in the trisectored base station. Each TRX has an internal power supply relay which allows it to be switched off and isolated. The power supply relays are controlled, through power control lines 34, by a power control unit in a base station control function 32.

If the power supply voltage from the power supply units falls below the predetermined threshold, the power control unit isolates the individual transceivers according to a predetermined power-shedding priority rating. This maintains maximum service provision under fault conditions.

Claims

1. Apparatus for managing power supply to a base station having a plurality of transceivers, the apparatus comprising a plurality of power supply units connected in parallel, control means connected to the output of the power supply units and operative, upon reduction in voltage from the power supply units, to disconnect the transceivers in a progressive manner in accordance with a predetermined power-shedding priority rating.

2. Apparatus according to claim 1, wherein the control means comprise a power distribution unit which supplies the transceivers by means of power buses to which the priority ratings are accorded.

3. Apparatus according to claim 1, wherein the control means comprise switches which control the supply of power to the transceivers and which are operative to disconnect the transceivers in accordance with the predetermined power shedding priority rating.

4. Apparatus for managing power supply to a base station having a plurality of transceivers, constructed and arranged substantially as herein particularly described with reference to Figure 1 or Figure 2 of the accompanying drawings.

Patents Act 1977 Examiner's report to the Comptroller under Section 17 The Search report) -6-	Application number GB 9317893.7
Relevant Technical Fields (i) UK Cl (Ed.L) H2H HAA, HAD, HAS, HAK, HSL; H2K KCX; H4L LDFC, LECX (ii) Int Cl (Ed.5) H02H 3/24, 7/12; H02J 1/00, 3/14; H04M 1/72; H02M 3/28, 7/08, 7/17, 7/23; H04B 1/16, 1/74; H04Q 7/00, 7/02, 7/04	Search Examiner M J BILLING Date of completion of Search 15 October 1993
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) On-line database: WPI	Documents considered relevant following a search in respect of Claims :- 1-3

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
Y	GB 1513812	(VETRO) example see page 1 line 62, page 2 line 30	1-3
Y	EP 0310284 A2	(TOSHIBA) example see Abstract	1-3
Y	EP 0287305 A2	(NEC) example see Abstract	1-3
Y	US 4935642	(NIXDORF) example see Abstract Figure 4	1-3
Y	US 4902956	(SLOAN) example see Abstract, column 7, lines 47-68	1-3
Y	US 4129893	(ANGELLO) example see Abstract	1-3

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